

ABSTRACT OF THE DISCLOSURE

A device and method for on-line correction of patient motion in three-dimensional positron emission tomography. The devices encompass an on-line hardware pipelining architecture to support 3D translation, normalization, and weighted histogramming as required.

5 For the 3D translation circuit, a first digital pipeline latch is provided for receiving data as it is collected by the PET scanner. A bank of multiplier circuits receives the PET scan data. Each multiplier circuit receives and multiplies a portion of the entire scan data simultaneous with each other multiplier circuit. The product of each multiplier
10 circuit is output to a second digital pipeline latch. The data is then passed to a bank of adders, each of which supports four input variables. While a specific LOR and a current object orientation are input to the first digital pipeline latch, processing for a different LOR and an earlier object orientation are stored in the second digital pipeline latch.

15 Additionally, fully transformed coordinates from a third LOR are loaded into a third digital pipeline latch. As the banks may each complete their respective tasks under a threshold time limit, the pipelining technique permits the entire 3D transformation for the AB pair to take place in real time. Further, on-line normalization and on-
20 line weighted histogramming are also performed in real time.